EasyWeld

EasyCT 213/312 Multipurpose

Tig / Plasma Cutter

Operation Manual

Hong Kong EasyWeld Limited

Introduction

The EasyCT series of Welders is a revolutionary new approach to Welding technology. Easyweld introduced a more efficient way to manufacture top quality machines while keeping the cost of operation and repairs lower. This was accomplished using several new approaches to the mainstream technology. One of these methods is our proprietary plug-and-play main circuit boards which allow ease of repair, reducing the downtime to only hours rather than days, while also reducing repair costs averaging less than $75! The EasyCT 213/312 uses special safety redundant circuitry with built in auto-protection and self adjusting circuitry to keep your machine running in a safe threshold. This helps protect your machine from over-voltage, power spikes, burn-outs and shorting.

Warranty

The machine is insured against damage upon shipping. If you machine is damaged in any way when you receive it, you must retain all shipping materials and packing. Call our customer service department and report the damage immediately.

There is a 1 year warranty on all internal electronic parts. The torch, power cord, clamps, air regulator, hoses, case & paint and consumables and cables are not covered under warranty. You must use dry gas in your machine and keep it indoors away from rain and moisture.

This machine is designed to operate from 200-240vac at 50-60Hz Only. Operating outside of limits will void warranty.

Warranty coverage covers repair or replacement of damaged machine or damaged circuit board. Warranty does not cover shipping from the customer but does cover return shipping within the Cont. United States. If you are going to return a machine to us for repairs, it must be well packed and insured.

Customers who own machines that require warranty coverage should contact our warranty department by email at info@hkweld.com to obtain a return authorization code.

Customers who own an out-of-warranty machine that require repairs should contact us for an estimate.

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WARNING

Welding and cutting is dangerous to the operator, people in or near the working area, and the surrounding, if the equipment is not correctly operated. Therefore, the performance of welding/cutting must only be under the strict and comprehensive observance of all relevant safety regulations. Please read and understand this instruction manual carefully before the installation and operation.

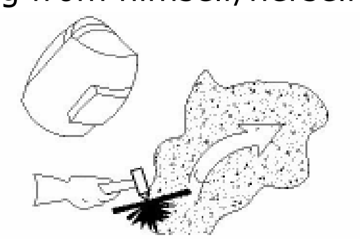
- The switching of function modes is possibly damaging to the equipment, while the welding operation is performed.
- Do disconnect the electrode-holder cable with the equipment, before the performance of welding.
- A safety switch is necessary to prevent the equipment from electric-leakage.
- Welding tools should be of high quality.
- Operators should be qualified.

Electric Shock: It may be fatal



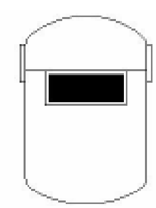
- connect the earth cable according to standard regulation.
- Avoid all contact with live components of the welding circuit, electrodes and wires with bare hands. It is necessary for the operator to wear dry welding gloves while he performs the welding task.
- The operator should keep the working piece insulating from himself/herself.

Smoke and Gas generated wile welding or cutting: harmful to people's health.



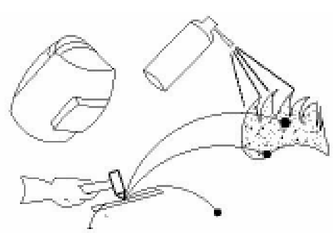
- Avoid of breathing the smoke and gas of welding or cutting.
- Keep the working area in good ventilation.

Arc light-emission: harmful to people's eyes and skin



- Wear the welding helmet, anti-radiation glass and work clothes while the welding operation is performed.
- Measures also should be taken to protect people in or near the working area.

Fire hazard



- The welding splash may cause fire, thus remove flammable material away from the working place.
- Have a fire extinguisher nearby, and have a train fire person ready to use it.

Noise: Possibly harmful to peoples' hearing.



- Surface noise is generated while welding/cutting, the hearing aids is necessary in some cases.

Machine Fault:

- Consult this instruction manual.
- Contact your local dealer or supplier for further advice.

GENERAL DESCRIPTION

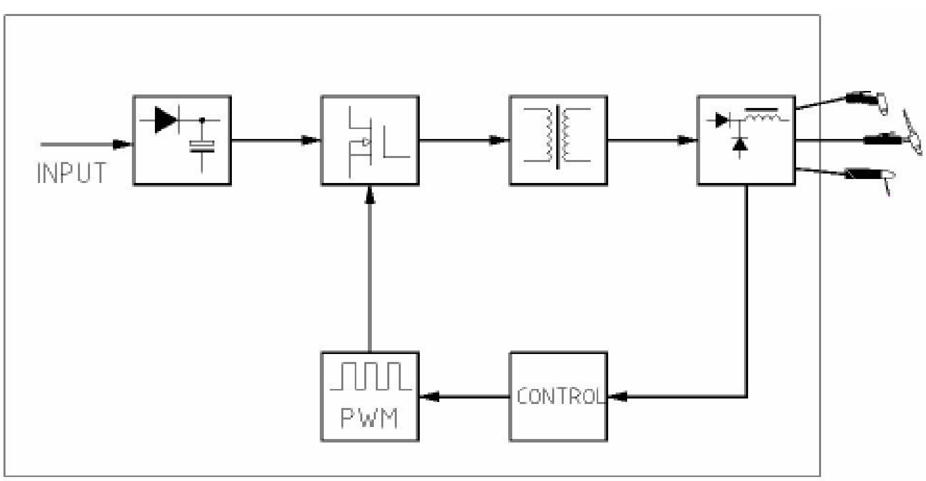
This welding & cutting equipment is manufactured with advanced inverter technology. With power component MOSFETS and by adopting PWM technology, the inverter converts DC voltage which is rectified from input AC voltage to the high 100KHz frequency AC voltage; as a consequence, the voltage is transformed and rectified. Therefore, it result the much more small-sized of the main transformer and lighter in weight of the inverter welding/cutting equipment, which rates the performance of cutting by 30%. The high frequency oscillation, which enables the output of the high frequency DC, is employed in the arc-starting system. The features of this product are as following: stable output, reliable, completely portable, efficient and low noise generated while cutting is performed.

EasyCT 213/312 is a welding & cutting equipment of two functions: TIG and CUTTING.
During the operation of TIG welding, this welding & cutting equipment is featured with the stability of output. The stability of welding current output is not frustrated by variation of arc length. During the plasma cutting operation, being compressed by high pressure of compressed air, the arc, of which the temperature rises rapidly up to 10000-15000t, is of highly ionized status, as a consequent, it produces the powerful plasma arc for cutting. By the employment of plasma cutting, it is energy saving and efficient; the high speed of metal cutting and smooth incised surface is accessible.
EasyCT 213/312 is applicable in welding and cutting of various kinds of metal materials, such as carbon steel, stainless steel, alloy steel, copper and other nonferrous metals etc. Also they are small in measurement, high efficient, energy saving, stable in output and reliable in quality; the ratio of input voltage and output voltage of this welding & cutting equipment is up to 85%.
Guarantee of maintenance for main engine of this welding & cutting equipment is one year, excluding other spare parts.

EasyCUT 213/312 is a kind of new plastic products, the cover of which is made of impact resistance engineering plastics. It possesses more advantages compared to machines of iron case, such as beautiful design, excellent insulation, and waterproof.

During the guarantee maintenance period, all maintenance is free of charge, excluding the deliberated damage to this welding & cutting machine.
Only qualified technician are authorized to carry out the repair task of this welding & cutting equipment in case of machine fault.

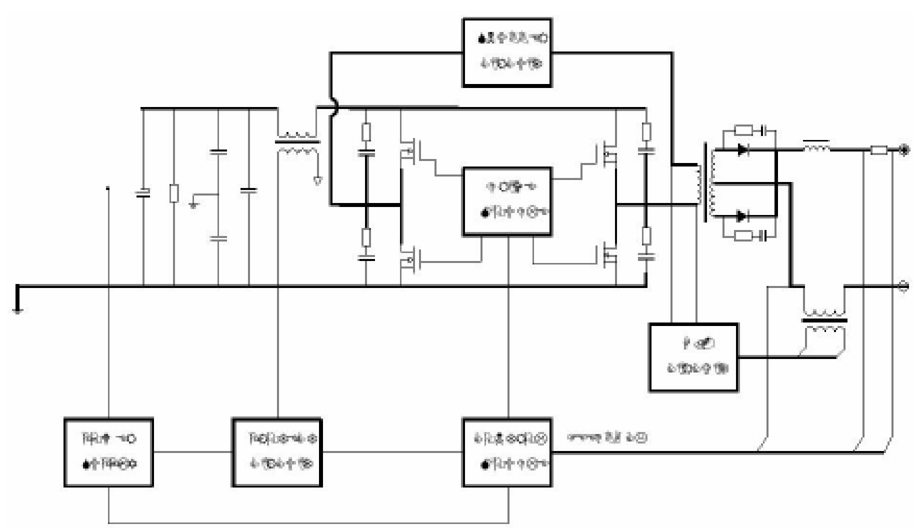
Block Diagram



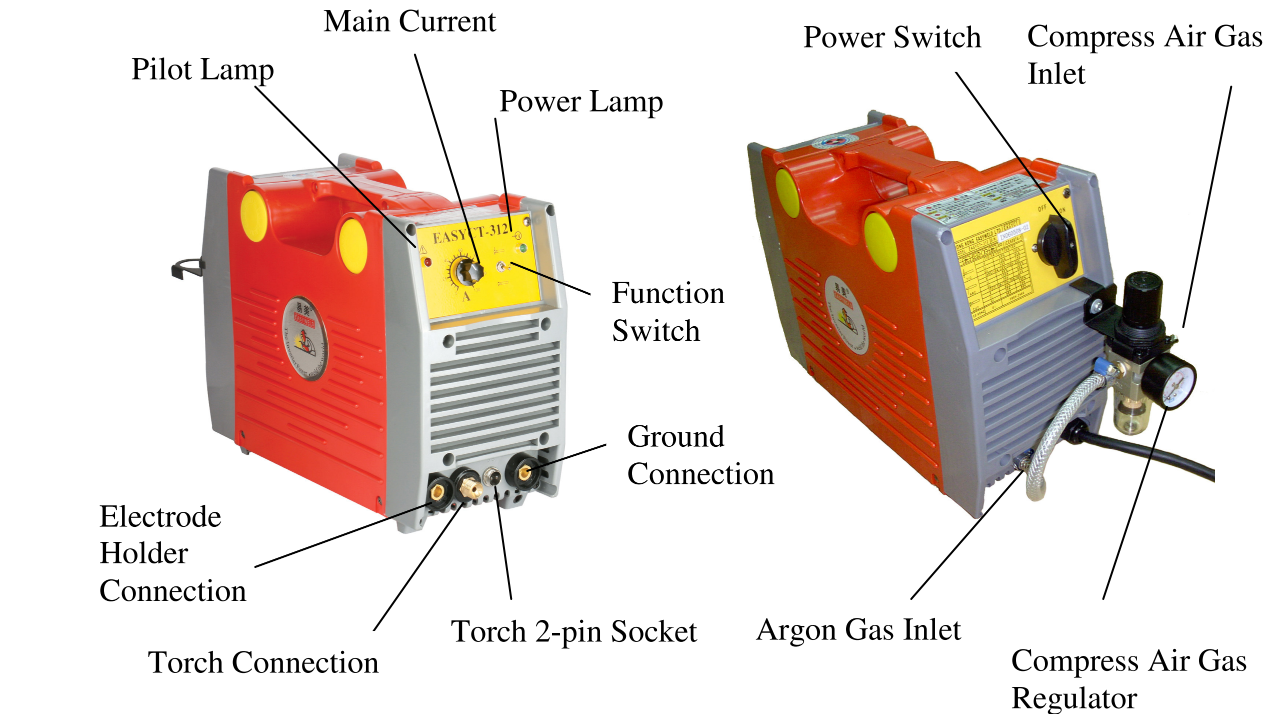
MAIN PARAMETER

TYPE	EasyCT 312			EasyCT 213	
Input Voltage (VAC)	220±15%			220±15%	
Input Frequency (Hz)	50/60			50/60	
Consumption (KVA)	3.5			4.2	
No-load Loss (W)	40			40	
Duty Cycle (%)	60			60	
Power Factor	0.93			0.93	
Efficiency (%)	85			85	
Insulation Class	B			B	
Protection Class	1P21			1P21	
Weight (Kg)	8			8	
Size(mm)	395 × 163 × 290			390x280x390	
	TIG	**PLASMA**	**MMA**	**TIG**	**PLASMA**
Input Current (A)	10.2	16	15.6	10.2	19
Output Current (A)	130	30	120	125	30
Current Range (A)	5~130	15~30	10~120	10~125	10~30
No load Voltage (V)	60	230	60	55	220
Working Voltage (V)	15	92	25	15	92
Nozzle Internal (mm)	-	Dia. 10	-	-	Dia. 10
Air Pressure (MPa)	-	0.4	-	-	0.4
Gas Flow (L/min)	2~5	80	-	2~5	80
Applicable Thickness(mm)	-	1~8	-	-	1~8
Arc-Starting	HF Vibration	HF Vibration	-	HF Vibration	HF Vibration

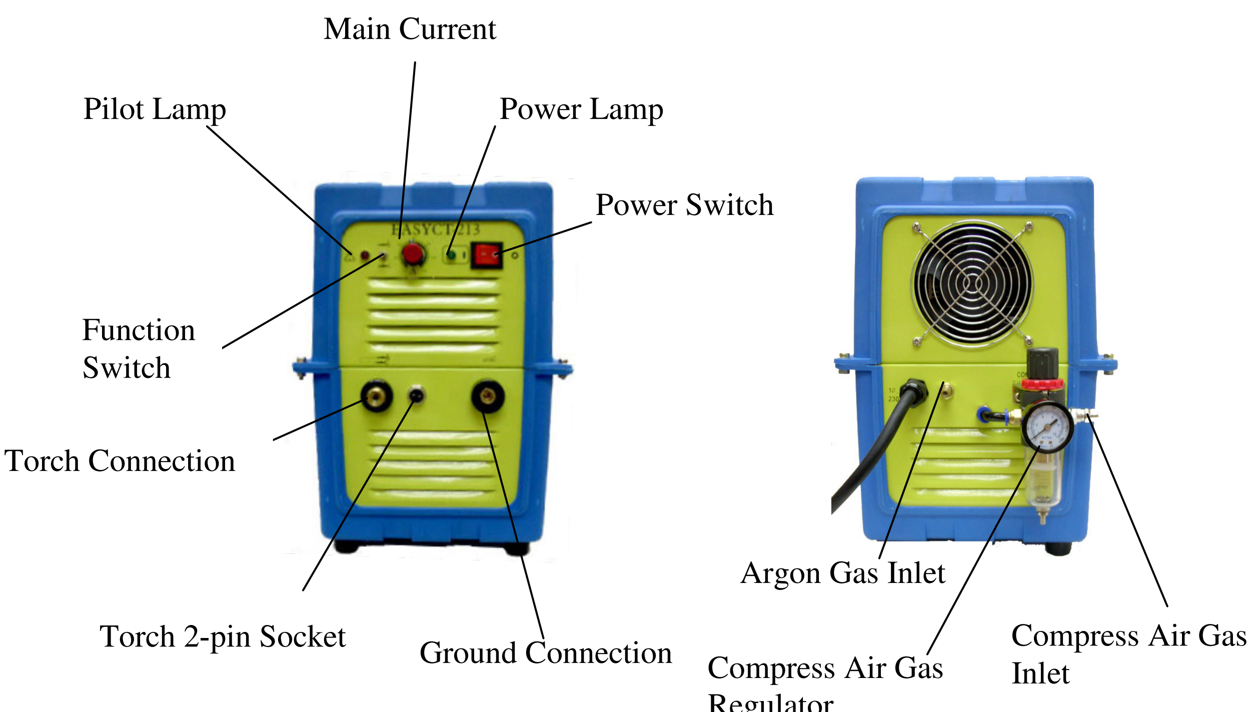
CIRCUIT DIAGRAM



INSTALLATION



CT-312



CT-213

1. **Connection of the Input Cables**
   Connect this welding & cutting equipment with power supply of 220V AC. Connect the earth terminal with the earth cable of minimum diameter of 2.5mm^2.
2. **Connection of the Output Cables**
   2a. Install welding/cutting torch according to the drawing.
   2b. Connect the one-knob connector and air plug to the corresponding connector on the panel board. Then fasten the screw.
   2c. Plug the air plug of the back cable to in the clockwise direction. Connect

earth clamp with work piece.

2d. The electrode holder cable should normally be connected to the positive terminal, while the work piece should be connected to the negative terminal.

3. Power Supply Switch

In case that power switch is on, built-in fan start work and current meter displays the current value.

4. **Function Switch**

Function switch enables the option among MMA, TIG and CUT according to practical welding task requirement.

4a. TIG Welding Function

Connect with gas supply: Connect the argon hose to the copper nozzle of the back panel. The gas supply system includes the gas bottle, air regulator and gas hose. The connection of parts of gas system should be firm to prevent the gas leakage.

Install the argon torch according to the drawing. Connect the copper screw on the cutting torch to the output terminal of the one-knob of the front panel, and fasten it toward clockwise direction to avoid gas leaking.

Connect the plug of the closed circuit to the "+" socket on the panel board; Connect the earth clamp with the work piece.

4b .PLASMA Cutting Function

Connect the gas hose with the terminal "IN" of regulator and connect the "OUT" terminals of regulator with the copper tub. The pressure and volume of output gas should be sufficient.

Connect the copper nut of the cutting torch to the knob of the panel board; plug with the plug of the panel board.

Connect the fast plug of earth cable with front panel of this welding & cutting equipment.

4b .MMA Welding Function (CT-312)

There are two modes of connection according to the specification of welding electrode.

•Straight polarity: electrode holder to "-", work piece to "+";

•Reverse polarity: electrode holder to "+", work piece to "-"

5. Welding Current Output Setting

According to practical demand, set the parameters of current output by the operation of "ARC" "TIG", or "CUT"

INSTALLATION OF THE GAS REGULATOR:

1) Seal the connection of the copper gas hose and the "IN" terminal and 'OUT" terminals.
2) Connect the regulator seal to the installation place of the regulator.
3) Fix the rack with screw to the place of the air regulator at the back of the machine.
4) Remove the rubber nut. Connect the regulator with the track.
5) Release the gas valve, modulate the pressure of gas to stipulated pressure, and press the button.
6) The gas pressure is 4 times of normal atmospheric pressure.
7) In case that the water-filtering bottle is full with water, remove the water.

Please note that:

--Please choose the Argon gas supply respectively for TIG welding and compressed air supply of higher than 4 bars for plasma cutting.

--The duty cycle for cutting of the machine is 60%.

OPERATION

1. TIG Welding Function

1) While this welding & cutting equipment is operated, power supply indicator is on, and the built-in fan is functioning.
2) Opt the TIG welding function mode.
3) Press the gas-releasing button, and modulate the volume of gas output to the required value.
4) Press the button of welding torch, and the electromagnetic valve functions. The sound of electricity releasing is audible and there is gas out from welding torch.

   Please note that: before the initial welding operation, press the button of welding torch for several seconds in order to remove the gas inside the gas tub, and the welding operation is accessible. There is gas output within a few seconds after the welding operation that is special design to protect the welding point before it is cooling down. Therefore, after the extinction of arc, maintain the welding position to abstract the heat produced during the welding operation.
5) The welding current output is adjustable, according to the thickness of welding material and required craftsmanship.
6) Maintain the distance of 1-4mm between the tungsten electrode and the work piece. Press the button of welding torch. HF electricity releasing between the welding electrode and the work piece occurs; after the arc starting, the splash of HF arc starting will vanish and the welding operation is available.

2. PLASMA Cutting Function

Opt the plasma-cutting mode.

While this welding & cutting equipment is operated, the power supply indicator is on, and the built-in fan is functioning.

Release the regulator valve, and modulate the pressure and volume of output gas.

Press the button of the cutting torch, the sound of electricity releasing is audible and there is gas out from welding torch.

According to the thickness of work piece, adjust the current output, and then the plasma cutting is accessible.

Contact the nozzle of the cutting torch with the work piece, press the button of the welding torch, the sound of HF arc starting vanishes and the cutting operation is accessible. After the arc starting, maintain the distance of about 1mm, in order to protect the nozzle from possible damage.

In case of difficulty in arc starting, it is recommended to reduce the pressure of gas output.

If the nozzle is damaged, adjust the pressure of gas output.

CAUTIONS

1. Working environment

1.1 The location in which this welding & cutting equipment is installed should be of little dust, corrosive chemical gas, flammable gas or materials, and of maximum 80% humidity.

1.2 Avoid the operation of welding & cutting in the open air unless sheltered from the sun shining, rain water and snow etc; the temperature of working

environment should be maintained within -10°C to +40°C.

1.3 Keep this welding & cutting equipment 30cm distant from the wall.

1.4 Keep the working environment in good ventilation.

2. Safety tips

2.1Ventilation

This welding & cutting equipment is small-sized, compact in structure and of excellent performance in current output. Fans are required to abstract heat generated by this cutting equipment while the operation of welding is carried out.

Cautions: Maintain good ventilation of the louvers of this welding & cutting equipment. The minimum distance between this welding & cutting equipment and any other objects in or near the working area should be 30 cm. Good ventilation is of critical importance for the normal performance and service life of this welding & cutting equipment.

2.2 Welding operation is forbid while this welding & cutting equipment is of over-load.

A sudden halt may occur while the cutting operation is carried out while this welding & cutting machine is of over-load status. Under this circumstance, it is unnecessary to restart this welding & cutting equipment. Keeps the built-in fan working to bring down the temperature inside this welding & cutting equipment.

2.3 Over-voltage is forbid.

Regarding the power supply voltage range of the welding & cutting machine, please refer to "Main parameter" table. This welding & cutting equipment is of automatic voltage compensation, which enables the maintaining of the voltage range within the given range. In case that the voltage of input power supply current exceeds the stipulated value, it is possibly damaging to the components of this welding & culling equipment.

2.4 An earth terminal available for this welding & cutting equipment. Connect with the earth cable to avoid the static and electric shock.

It is strongly forbid to contact the output terminal when the welding & cutting operation is performed. An electric shock possibly occurs.

MAINTENANCE

Exposure to extremely dusty, damp, or corrosive air is damaging to this welding & cutting machine. In order to prevent any possible failure or fault of this welding & cutting equipment, clean the dust at regular intervals with clean and dry compressed air of required pressure.

Please note that: lack of maintenance can spell to the unavailability and cancellation of the guarantee; the guarantee of this welding & cutting equipment will be no longer available in case that it has been attempted to take the machine apart or the open the factory-made sealing of the machine.

TROUBLESHOOTING

CAUTIONS Only the qualified technicians are authorized to undertake the repair task of this welding & cutting equipment in case of machine fault.

Fault Symptoms	Rectification
1. While this welding & cutting equipment is off, the built-in fan is not functioning, and there is no output.	1. Possible damage of power supply switch, compensate the damage if necessary. 2. Possible unavailability of power supply. Check and compensate the failure if necessary 3. Possible short-circuit of the input cable. Check it

	and compensate it if necessary.
2. While this welding & cutting equipment is operated, the pilot lamp is on, no output, the built-in fan unavailable.	1. Possible misconnection with input of 380V, and occurrence of over voltage protection status. Reconnect with input of 220V, and restart. 2. Possible unstable input due to the un-available input cable or possible connection unavailable spells it's being of over-voltage protection status. 3. Frequently switching on and off of this welding equipment in a short period leads this equipment's being of over-voltage protection. Switch off this welding machine and wait for at least 3 minutes, then restart this welding equipment. 4. Possible unavailability of the connection of switch and bottom PCB. Reconnect it. 5. The 24 V relay of bottom PCB is possibly damaged. Replace it if necessary.
3. While this welding & cutting equipment is operated, the built-in fan functions, fault indicator is off, no HF electricity releasing, the arc starting is unavailable.	1. The normal voltage of positive and negative pole of board VH-07 should be DC 380V. 1.1 Possible short circuit occurs, and possible unavailability of connection of silicon bridge with the PCB. 1 .2 Possible electricity leakage of capacitors, replace them if necessary. 2. A green light indicator of secondary power supply of MOS PCB should be on. Otherwise, it indicates that the secondary power supply is not functioning. Check the connection whether is available. If fault cannot be rectified, please contact the supplier for further advice. 3. Possible unavailability of connection inside this welding equipment occurs. Check and reconnect if necessary. 4. Possible malfunction of control circuit occurs. Check otherwise contact the supplier for further advice. Possible damage of the welding torch. Replace it if necessary.
4. While this welding & cutting equipment is operated, the HF electricity releasing is available, and the welding current output is unavailable.	1. Possible disconnection of welding torch cable. 2. Possible disconnection of earth cable, or unavailability of connection of the earth cable and work piece. 3. The connection between positive output terminal or the gas or electricity output terminal and this welding equipment is possibly unavailable. Reconnect them if necessary.
5. While is this welding & cutting equipment is operated, the fault indicator is off, no electricity releasing, and the arc starting available.	1. The cable connection between the transformer of arc starting and power PCB is possibly unavailable. Check and reconnect it. 2. Possible oxidization of electricity releasing parts occurs. In another possible case, the distance is larger than the maximum distance available. Remove the oxidization of the electricity releasing parts and adjust the distance of the electricity releasing parts to range of 1mm. 3. Possible damage to MMA/TIG switch. Replace them if necessary.

	4. Components of HF arc starting circuit are possibly damaged. Check and replace them if necessary.
6. While this welding & cutting equipment is operated, the fault indicator is on, and there is no output.	1. It is possible of over-current protection status. Switch off the power supply, wait till the fault indicator is off, and restart this welding equipment. 2. It is possible of over-heating protection status. Wait till the fault indicator is off, and the welding operation will be available. 3. Possible fault with Inverter circuit. Disconnect the power supply plug (VH-0]) of transformer of top PCB. And restart this welding equipment. 3.1 If the fault indicator is still on. Switch off the power supply of this welding equipment. Disconnect the power supply plug (VH-03) of HF arc starting. 3.1.1 If the fault indicator is on, MOFESTS of top PCB is possibly defective. Replace it, if necessary 3.1.2 Possible damage of transformer of center PCB. Replace it if necessary. 3.2 If the fault indicator is off. 3.2.1 Possible damage of transformer of center PCB. Replace it if necessary. Measure the inductance value and Q value. L=O.9-1 .6mH Q>35. If both of the inductance value and Q value are comparatively low, replace them. 3.2.2 Possible damage of secondary rectifier of transformer. Replace it if necessary. 4. Possible damage of feed back circuit. Replace it if necessary.
7. Unstable current output during the welding operation and the variable resistance is unavailable.	1. Possible damage of I K resistance. Replace it if necessary. 2. The connection of this welding equipment is not available.
8. Excessive plash generated during welding operation. It is difficult to weld with alkaline rod.	1. Misconnection of earth cable and welding torch cable. 2. Reconnect them.
9. Insufficiency in welding and cutting performance and the arc is not stable.	1. Possible insufficiency of voltage input. 2. The connection of earth cable is unavailable. Reconnect it. 3. The gas supply system is unavailable. Examine it and compensate it if necessary. 4. There is possible deficiency of electrode of cutting torch. Compensate it. 5. The wave-filtering capacitor of this welding & cutting equipment is not available. Replace it if necessary. 6. The rod is not available, due to the fact that the rod is been affected with damp or unqualified. 7. The current is not available to start the arc.